AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (previously presented) A multi-stage compressor system that compresses air supplied to a cathode of a fuel cell system, comprising:

a first stage compressor that compresses inlet air to provide a first pressurized air stream at a first pressure;

a second stage compressor comprising:

a compression unit that compresses said first pressurized air stream to a second pressurized air stream at a second pressure; and

a drive unit that drives said compression unit using expansion energy of an exhaust stream of said fuel cell;

a first heat exchanger that enables heat transfer between said second pressurized air stream and said exhaust stream to heat said exhaust stream; and

a bypass valve having an open state, a closed state and a partially open state, wherein when in said closed state said first pressurized stream flows to said second stage compressor, when in said open state said first pressurized stream bypasses said second stage compressor and when in said partially open state a portion of said first pressurized stream bypasses said second stage compressor.

2. (original) The multi-stage compressor system of claim 1 further comprising a

second heat exchanger disposed between said first stage compressor and said second stage compressor to reduce a temperature of said first pressurized air stream.

3. (previously presented) A multi-stage compressor system that compresses air supplied to a cathode of a fuel cell system, comprising:

a first stage compressor that compresses inlet air to provide a first pressurized air stream at a first pressure;

a second stage compressor comprising:

a compression unit that compresses said first pressurized air stream to a second pressurized air stream at a second pressure; and

a drive unit that drives said compression unit using expansion energy of an exhaust stream of said fuel cell;

a first heat exchanger that enables heat transfer between said second pressurized air stream and said exhaust stream to heat said exhaust stream; and

a second heat exchanger disposed between said first stage compressor and said second stage compressor to reduce a temperature of said first pressurized air stream; wherein said second heat exchanger is in series with said first heat exchanger and enables heat transfer between said first pressurized air stream and said exhaust stream.

4. (cancelled)

5. (previously presented) The multi-stage compressor system of claim 1

wherein in said closed state said second pressurized air stream is inhibited from fluid communication with said exhaust stream and when in one of said partially open state and fully open state a corresponding portion of said second pressurized air stream is in fluid communication with said exhaust stream.

6. (original) The multi-stage compressor system of claim 1 further comprising a second heat exchanger disposed downstream of said first heat exchanger to reduce a temperature of said second pressurized air stream.

7. (original) The multi-stage compressor system of claim 1 wherein said drive unit comprises an expander having variable guide blades.

8. (original) The multi-stage compressor system of claim 1 wherein said drive unit comprises an expander having a waste gate bypass.

9. (previously presented) A fuel cell system, comprising:

a fuel cell stack; and

a compressor system that supplies compressed air to a cathode of said fuel cell stack, said compressor system comprising:

a first stage compressor that compresses inlet air to provide a first pressurized air stream at a first pressure:

a second stage compressor including a compression unit that compresses said first pressurized air stream to a second pressurized air stream at a second

pressure and a drive unit that drives said compression unit using expansion energy of an exhaust stream of said fuel cell stack;

a first heat exchanger that enables heat transfer between said second pressurized air stream and said exhaust stream; and

a bypass valve having an open state, a closed state and a partially open state, wherein when in said closed state said first pressurized stream flows to said second stage compressor, when in said open state said first pressurized stream bypasses said second stage compressor and when in said partially open state a portion of said first pressurized stream bypasses said second stage.

10. (original) The fuel cell system of claim 9 further comprising a second heat exchanger disposed between said first stage compressor and said second stage compressor to reduce a temperature of said first pressurized air stream.

11. (previously presented) A fuel cell system, comprising:

a fuel cell stack; and

a compressor system that supplies compressed air to a cathode of said fuel cell stack, said compressor system comprising:

a first stage compressor that compresses inlet air to provide a first pressurized air stream at a first pressure;

a second stage compressor including a compression unit that compresses said first pressurized air stream to a second pressurized air stream at a second

pressure and a drive unit that drives said compression unit using expansion energy of an exhaust stream of said fuel cell stack;

a first heat exchanger that enables heat transfer between said second pressurized air stream and said exhaust stream; and

a second heat exchanger disposed between said first stage compressor and said second stage compressor to reduce a temperature of said first pressurized air stream;

wherein said second heat exchanger is in series with said first heat exchanger and enables heat transfer between said first pressurized air stream and said exhaust stream.

12. (cancelled)

13. (previously presented) The fuel cell system of claim 9 wherein in said closed state said second pressurized air stream is inhibited from fluid communication with said exhaust stream and when in one of said fully open state and said partially open state a corresponding portion of said second pressurized air stream is in fluid communication with said exhaust stream.

14. (original) The fuel cell system of claim 9 further comprising a second heat exchanger disposed downstream of said first heat exchanger to reduce a temperature of said second pressurized air stream.

15. (original) The fuel cell system of claim 9 wherein said drive unit comprises an expander having variable guide blades.

16. (original) The fuel cell system of claim 9 wherein said drive unit comprises an expander having a waste gate bypass.

17. (previously presented) A method of operating a fuel cell system in first and second modes, comprising:

compressing inlet air with a first compressor to provide a first pressurized air stream at a first pressure when operating in said first and second modes;

compressing said first pressurized air stream with a second compressor to provide a second pressurized air stream at a second pressure when operating in said second mode;

driving said second compressor using exhaust gas of said fuel cell system when operating in said second mode;

heating said exhaust gas by way of heat transfer between said second pressurized air stream and said exhaust gas using a first heat exchanger when operating in said second mode;

closing a bypass valve when operating in said first mode to inhibit flow of said first pressurized stream to said second compressor; and

opening said bypass valve to one of a fully open state and a partially open state when operating in said second mode to enable flow of said first pressurized stream to said second compressor.

18. (previously presented) The method of claim 17 further comprising reducing a temperature of said first pressurized air stream using a second heat exchanger disposed between said first stage compressor and said second stage compressor.

19. (previously presented) A method of operating a fuel cell system in first and second modes, comprising:

compressing inlet air with a first compressor to provide a first pressurized air stream at a first pressure when operating in said first and second modes;

compressing said first pressurized air stream with a second compressor to provide a second pressurized air stream at a second pressure when operating in said second mode;

driving said second compressor using exhaust gas of said fuel cell system when operating in said second mode;

heating said exhaust gas by way of heat transfer between said second pressurized air stream and said exhaust gas using a first heat exchanger when operating in said second mode; and

reducing a temperature of said first pressurized air stream using a second heat exchanger disposed between said first stage compressor and said second stage compressor;

wherein said second heat exchanger is in series with said first heat exchanger and enables heat transfer between said first pressurized air stream and said exhaust stream.

20. (cancelled)

21. (previously presented) The method of claim 17 further comprising:

opening said bypass valve to one of a fully open state and a partially open state when operating in said second mode to enable fluid communication between a corresponding flow of said second pressurized stream and said exhaust stream; and

closing said bypass valve when operating in one of said first and second modes to inhibit fluid communication between said second pressurized stream and said exhaust stream.

22. (previously presented) The method of claim 17 further comprising reducing a temperature of said second pressurized air stream using a second heat exchanger disposed downstream of said first heat exchanger.

23. (original) The method of claim 17 further comprising varying guide blades of an expander to regulate capacity of said second compressor.

24. (previously presented) The method of claim 17 wherein said step of driving said second compressor is achieved using an expander having a waste gate bypass.

25. (previously presented) A method of compressing air supplied to a cathode of a fuel cell system, comprising:

compressing inlet air with a first compressor to provide a first pressurized air stream at a first pressure;

compressing said first pressurized air stream with a second compressor to provide a second pressurized air stream at a second pressure;

driving said second compressor using exhaust gas of said fuel cell system;

heating said exhaust gas by way of heat transfer between said second pressurized air stream and said exhaust gas; and

circumventing said second stage compressor when said fuel cell system is operating in a first mode and directing said first pressurized air stream to said second stage compressor when said fuel cell system is operating in a second mode.

26. (currently amended) The method of claim 25 wherein heating said exhaust gas by way of heat transfer between said second pressurized air stream and said exhaust gas uses a first heat exchanger; and further comprising reducing a temperature of said first pressurized air stream in a second heat exchanger disposed between said first stage compressor and said second stage compressor.

27. (currently amended) A method of compressing air supplied to a cathode of a fuel cell system, comprising:

compressing inlet air with a first compressor to provide a first pressurized air stream at a first pressure;

compressing said first pressurized air stream with a second compressor to provide a second pressurized air stream at a second pressure;

driving said second compressor using exhaust gas of said fuel cell system;

heating said exhaust gas by way of heat transfer between said second pressurized air stream and said exhaust gas using a first heat exchanger; and

reducing a temperature of said first pressurized air stream in a second heat exchanger disposed between said first stage compressor and said second stage compressor;

wherein said second heat exchanger is in series with said first heat exchanger and enables heat transfer between said first pressurized air stream and said exhaust stream.

28. (cancelled)

29. (original) The method of claim 25 further comprising feeding back a portion of said second pressurized air stream to mix with said exhaust stream.

30. (original) The method of claim 25 further comprising reducing a temperature of said second pressurized air stream.

31. (original) The method of claim 25 further comprising regulating a capacity of said second compressor by varying guide blades of an expander.

32. (original) The method of claim 25 wherein said step of driving said second compressor is achieved using an expander having a waste gate bypass.